

CLAIMS

Sub B1
1. Process for the production of a mixture comprising hydrogen and CO₂, of the type according to which partial oxidation of a hydrocarbon by an oxygenated medium or a medium capable of releasing oxygen is carried out, and according to which the processing is carried out under autothermal conditions, the heat given off by said oxidation being recovered to maintain the endothermic reactions which take place between the nonoxidized fraction of said hydrocarbon and the CO₂ and the steam produced by said oxidation, characterized in that:

the reaction gas mixture comprising the hydrocarbon and the oxygenated medium is passed through a porous medium which has been preheated beforehand, thus making it possible to heat the reaction gas mixture by heat exchange with the porous medium to a temperature threshold sufficient to initiate combustion reactions, rendering unnecessary an external heat supply when operating continuously.

2. Process according to Claim 1, characterized in that said preheated porous medium is formed by a first inert porous material and in that the reaction gas mixture successively encounters said first inert porous material, a catalytic bed (5) and then a second inert porous material (6).

3. Process according to Claim 2, characterized in that said first and second inert porous material are identical.

4. Process according to Claim 2 or 3, characterized in that said reaction gas mixture successively encounters said first inert porous material, said catalytic bed (5) and said second inert porous material (6) within a vertical cylindrical reactor (1), the ends of which are filled with one or other of said inert porous materials and the central part of which is filled with said catalytic bed (5), and in that the reactor is fed in alternate mode in the following way:

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100-52922850

i) the reaction gas mixture is introduced in the lower part of the reactor (1) and the mixture comprising the hydrogen and the CO is collected at the upper part of the reactor (1), or

5 ii) the reaction gas mixture is introduced in the upper part of the reactor (1) and the mixture comprising the hydrogen and the CO is collected at the lower part of the reactor (1),

10 passing from one of the introduction modes ((i))
10 (ii)) to the other as a function of the advance of the combustion front inside the reactor.

5. Process according to one of Claims 1 to 4, characterized in that the preheating of said porous medium is carried out using electrical elements
15 situated at the periphery of the reactor.

6. Process according to one of Claims 1 to 4, characterized in that the preheating of said porous medium is carried out by circulating therein, prior to said introduction of the reaction mixture, a preheating
20 gas mixture comprising a hydrocarbon and oxygen in proportions which make possible total combustion.

7. Process according to either of Claims 2 and 3, characterized in that said reaction gas mixture successively encounters said first inert porous
25 material, said catalytic bed (5) and said second inert porous material (6) within a reactor exhibiting the following arrangement:

30 - a first cylinder (40) comprising, at its lower end, means (41) for introducing said reaction gas mixture;

35 - a second cylinder (42) of smaller diameter than said first cylinder, inserted into said first cylinder (40) so that its upper end is situated at a distance from the upper end of the first cylinder (40) and so that its lower end, via which the mixture comprising the hydrogen and the CO is collected, emerges outside the first cylinder (40);

- said first inert porous material (43) filling at least a portion of the height of the annular space

defined by the internal wall of the first cylinder (40) and the external wall of the second cylinder (42);

- said catalytic bed (44) filling the upper part of the first cylinder (40) and/or that of the
5 second cylinder (42);

- said second inert porous material (45) filling the lower part of the second cylinder (42).

8. Process according to Claim 7, characterized in that the preheating of said porous medium is carried
10 out using electrical elements situated at the periphery of the reactor.

9. Process according to Claim 7, characterized in that the preheating of said porous medium is carried
15 out by circulating therein, prior to said introduction of the reaction mixture, a preheating gas mixture comprising a hydrocarbon and oxygen in proportions which make possible total combustion.

Add A1
Add b2